REMARKS/ARGUMENTS

Claims 1-36 and 49-53 remain in the application.

Claims 1, 9, 11, 14, 21, 28 and 33 are currently amended.

Claims 54-59 are newly presented.

Claim Rejections Under 35 USC § 102

Claims 1-3, 6, 10-25, 28, 34-36 and 49-53 were rejected under 35 USC § 102(b) as being anticipated by US Patent 5,968,111 to Bae, et al.

The present invention recited in claim 1 is a method for filtering data, wherein a plurality of data samples is received; a locus of the samples is computed; a value of an input sample is normalized to a range centered on the locus; and only then are the data passed through a distance-based filter. Additionally, the present invention includes limiting the normalized output value of the distance-based filter within selected limits of normalization.

In contrast, Bae et al. teaches an eight-degree circular median filter having a data sorter 20 that fails to limit the normalized output value of the distance-based filter within selected limits of normalization, as recited in amended claim 1.

Thus, Bae et al. fails to anticipate any means for containing the output value of the filter within the desired limits of normalization, which are typically +/-180 degrees, or 0 and 360 degrees. If the filter output value exceeds the desired limits of normalization, Bae et al. fails to anticipate any means for adjusting the filter output value and the internal filter storage locations to remain within the selected limits of normalization, as recited in newly presented claim 54.

Furthermore, Bae et al. fails to anticipate any means for adjusting the filter output value and the internal filter storage locations by plus or minus one circle, as recited in newly presented claim 55.

Thus, Bae, et al. fails to teach the limiter provided by the adjustment in **Block 170** that is utilized by the sliding window of linearization to prevent numeric overflow in the case where the input behavior is progressive rather than oscillatory. If the input data continue around the circle in the same direction over and over, the numeric output value can become very large. The limiter in **Block 170** prevents this overflow behavior. The output returned in **Block 180** is thus constrained to a range compatible with down-stream processing functions. Bae, et al. provides absolutely no teaching for controlling such an eventuality.

Thus, although Bae et al. deals with circular data, in contrast to the present invention, Bae et al. fails to provide any teaching for limiting the normalized output value of the distance-based filter within selected limits of normalization, as recited in claim 1.

For at least the above reasons, the invention recited in amended claim 1 is believed to be allowable over Bae, et al. as originally presented. Claims 2, 3, 6, 10 and 49 are allowable at least as depending from allowable claim 1.

Claims 11, 14, 21 and 28 differ in scope from allowable claim 1. However, the above arguments directed to claim 1 are sufficiently applicable to claims 11, 14, 21 and 28 as to make repetition unnecessary. Thus, for each of the reasons above, claims 11, 14, 21 and 28 are believed to be allowable as currently amended.

Claims depending from base claims 11, 14, 21 and 28 are allowable at least as depending from an allowable base claim.

Claim Rejections Under 35 USC § 103

Claims 4, 5, 7, 8, 26, 27 and 29-32 were rejected under 35 USC § 103(a) over US Patent 5,968,111 to Bae, et al. in view of US Patent 6,018,750 to Connell, et al.

As discussed above, Bae et al. fails to disclose or suggest limiting the normalized output value of the distance-based filter within selected limits of normalization, as recited in amended claim 1.

Connell, et al. fails to provide the deficiencies of Bae, et al. Connell, et al. teaches a median filter in a misfire detection system (column 3, lines 28-30) that also fails to disclose or suggest limiting the normalized output value of the distance-based filter within selected limits of normalization, as recited in amended claim 1.

For at least the above reasons, the invention recited in amended claim 1 is believed to be allowable over both Bae, et al. and Connell, et al.

Claims 4, 5, 7 and 8 are allowable at least as depending from allowable claim 1.

Claims 21 and 28 differ in scope from allowable claim 1. However, the above arguments directed to claim 1 are sufficiently applicable to claims 21 and 28 as to make repetition unnecessary.

Claims 26 and 27 are allowable at least as depending from allowable base claim 21.

Claims 29-32 are allowable at least as depending from allowable base claim 28.

Allowable Subject Matter

The Examiner is thanked for indicating that claims 9 and 33 contain allowable subject matter and would be allowable if rewritten in independent form. Although the Applicant believes that the base claims 1 and 28 from which claims 9 and 33 depend, respectively, are allowable as originally recited, the Applicant has herein rewritten claims 9 and 33 in independent form, including the limitations of the respective base claim, there being no intervening claims.

Newly Presented Claims

New claims 54-59 are presented herein. The subject matter of the newly presented claims, limiting the normalized output value of the distance-based filter within selected limits of normalization by adjusting the filter output value and the internal filter storage locations to remain within the selected limits of normalization, and adjusting the filter output value and internal filter storage locations by plus or minus one circle, is fully supported by the Specification and Figures of the instant patent application as originally filed. See, for example, Figure 6 and paragraph [0039] of the published application, as follows:

> [0039] FIG. 6 illustrates the median filter of the invention for multiple co-circular data points embodied in an exemplary flow chart 100. According to the method of the present invention, all data are normalized when input, before being stored. The present invention bypasses the need for multiple distance computations by computing in Block 110 a locus of the samples. Multiple computation algorithms are possible, depending on the desired balance between speed and accuracy. For example, the locus can be defined as the average of the two most recent samples. This is very fast, but subject to disturbance from a single bad sample. The locus also can be defined as the average of the two most recent samples together with the input sample. Alternatively, the locus is computed as the average of the three most recent samples, or as the average of the three stored samples. As the number of old samples increases, the responsiveness of the filter to high rates of change is reduced. In another alternative, the arithmetic mean, i.e., the average, of the data is replaced with one of the geometric mean, or the harmonic mean, or the quadratic mean. The locus is alternatively chosen as the most recent output value. The algorithm is substantially insensitive to

approximations at this level because the purpose of finding the locus is to select a center point around which the data are to be linearized. The continuously sliding window of linearization provided by the present invention avoids the problems in the prior art arising from fixed breakpoints The distance between the current input value and the locus is computed in Block 120 and compared in Block 130 with a maximum permissible value. For example, if the distance between the input value and the locus exceeds .+-.180 degrees, the sample is normalized in Block 140 by adding or subtracting 360 degrees to bring the sample within .+-.180 degrees of the locus. In Block 150 a standard or conventional median or other distance-based filter is applied to the resulting samples. Since all data are normalized before being filtered, the value produced by the computation is a meaningful number. Alternatively, the median filter of the invention as described herein is applied to the resulting samples, practically only for applications with small values of N. The output value of the filter is compared in Block 160 with the desired limits of normalization, which are typically .+-.180 degree, or 0 and 360 degrees. If the filter output value exceeds the desired limits of normalization, then the output and the internal filter storage locations are appropriately adjusted in Block 170 by .+-.360 degrees to remain within the desired output range. The limiter provided by the adjustment in Block 170 is utilized by the sliding window of linearization to prevent numeric overflow in the case where the input behavior is progressive rather than oscillatory. If the input data continue around the circle in the same direction over and over, the numeric output value can become very large. The limiter in Block 170 prevents this overflow behavior. The output returned in Block 180 is constrained to a range compatible with down-stream processing functions. (Emphasis added.)

Therefore, no new matter is added.

The claims now being in form for allowance, reconsideration and allowance is respectfully requested.

If the Examiner has questions or wishes to discuss any aspect of the case, the Examiner is encouraged to contact the undersigned at the telephone number given below.

Respectfully submitted,

Attorney: _____
Charles J. Rupnick

Registration No.: 43,068
Date: July 1, 2005
Post Office Address: PO Box 46752
Seattle, WA 98146
Telephone: (206) 439-7956
Facsimile: (206) 439-3223